

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A substrate assembly, comprising:

a support surface having a uniform composition and extending into a recess formed in the substrate;

a conductive layer spaced apart from the support surface and extending into the recess;
and

a plurality of high-K dielectric layers positioned between the support surface and the conductive layer, including [[a]] an un-annealed first high K dielectric layer, and a second high K dielectric layer including deposited components different from those in the first high K dielectric layer, wherein an interface between the support surface and the first high K dielectric layer remains substantially free of a support surface oxide present in the plurality of high-K dielectric layers.

2. (Original) The substrate assembly in claim 1, wherein said plurality of high-K dielectric layers comprises a first high-K dielectric layer contacting said support surface.

3. (Original) The substrate assembly in claim 1, further comprising a barrier layer between said support surface and said plurality of high-K dielectric layers.

4. (Original) The substrate assembly in claim 1, wherein said support surface is a capacitor electrode.

5. (Previously Presented) The substrate assembly in claim 1, wherein said plurality of high-K dielectric layers defines a thickness of at most 200 angstroms.

6. (Original) The substrate assembly in claim 5, wherein said plurality of high-K dielectric layers comprises a first high-K dielectric layer contacting said support surface and defining a thickness of at least a monolayer.

7. (Previously Presented) The substrate assembly in claim 6, wherein said first high-K dielectric layer defines a thickness of at least 10 angstroms.

8. (Currently Amended) A capacitor dielectric, comprising:

[[a]] an un-annealed first high-K capacitor dielectric comprising tantalum pentoxide formed on a support surface, wherein an interface between the first high-K capacitor dielectric and the support surface is substantially free of a support surface oxide;

a second high-K capacitor dielectric comprising tantalum pentoxide, contacting said first high-K capacitor dielectric, and

a conductive layer spaced apart from the support surface and extending into a recess, wherein the first high-K capacitor dielectric and the second high-K capacitor dielectric abut the support surface and the conductive layer.

9. (Original) The capacitor dielectric in claim 8, wherein said first high-K capacitor dielectric defines a first thickness; and wherein said second high-K capacitor dielectric defines a second thickness that is different from said first thickness.

10. (Cancelled)

11. (Previously Presented) The capacitor dielectric in claim 8, wherein said first high-K capacitor dielectric is a first oxide; and wherein said second high-K capacitor dielectric is a second oxide different from said first oxide.

12. (Currently Amended) A capacitor dielectric, comprising:

[[a]] an un-annealed first high-K capacitor dielectric comprising tantalum pentoxide;

a second high-K capacitor dielectric comprising a high-K dielectric having at least one different component than the first high-K capacitor dielectric and contacting said first high-K capacitor dielectric,

wherein said first high-K capacitor dielectric and said second high-K capacitor dielectric are oxides;

a support surface having a uniform composition and extending into a recess that supports the first high-K dielectric layer and the second high-K dielectric layer that remains substantially free of support surface oxides at an interface between the first high-K dielectric layer and the support surface; and

a conductive layer spaced apart from the support surface and extending into the recess, wherein the first high-K capacitor dielectric and the second high-K capacitor dielectric abut the support surface and the conductive layer.

13. (Currently Amended) A capacitor structure, comprising:

a first electrode layer having a uniform composition and extending into a recess in a substrate;

a dielectric layer disposed over said first electrode layer, wherein said dielectric layer comprises a plurality of consecutively-positioned sub-layers, wherein each of said sub-layers comprises a high-dielectric-constant material, wherein at least one of the sub-layers includes [[a]] an un-annealed deposited dielectric component different from one or more of the other sub-layers, and wherein one of said sub-layers is more oxidized than another of said sub-layers, further wherein the first electrode layer remains substantially free of an electrode layer oxide at an interface between the electrode layer and the dielectric layer; and

a second electrode layer disposed over said dielectric layer and extending into the recess.

14.-51. (Canceled)

52. (Currently Amended) A capacitor dielectric, comprising a plurality of capacitor dielectric layers defining a total thickness ranging from 50 to 70 angstroms, wherein each layer of said plurality is a tantalum pentoxide high-K dielectric defining an individual thickness ranging from

10 to 40 angstroms in thickness, and a dielectric layer adjacent a supporting surface is un-annealed, further wherein a supporting surface having a uniform composition and extending into a recess and abutting the plurality of capacitor dielectric layers remains substantially free of a supporting surface oxide at an interface between the supporting surface and the capacitor dielectric, and an electrode layer is disposed over the plurality of dielectric layers, the electrode extending into the recess.

53. (Original) The capacitor dielectric of claim 52, wherein at least a lowest layer of said plurality defines an individual thickness of about 20 angstroms.

54-61. (Cancelled)

62. (Currently Amended) A capacitor dielectric, comprising a plurality of capacitor dielectric layers positioned between a supporting surface having a uniform composition and extending into a recess and an electrode layer extending into the recess, the dielectric layers defining a total thickness ranging from 50 to 70 angstroms, wherein each layer of said plurality is a high-K dielectric defining an individual thickness ranging from 10 to 40 angstroms in thickness, and a dielectric layer adjacent a supporting surface is un-annealed, wherein at least one layer of said plurality manifests greater oxidation than would an equal thickness of an underlying layer of said plurality, wherein at least one layer in the plurality includes a component not present in other layers of the plurality, and wherein the underlying layer includes a means to minimize oxidation beyond the plurality of capacitor dielectric layers and into the supporting surface that extends into the recess, further wherein an underlying layer oxide is substantially absent from an interface between the capacitor dielectric and the underlying layer.

63. (Currently Amended) A capacitor dielectric, comprising a plurality of capacitor dielectric layers disposed between a supporting surface having a uniform composition and extending into a recess and an electrode layer extending into the recess, wherein each layer of the plurality is a high-K dielectric, and a dielectric layer adjacent a supporting surface is un-annealed, further wherein at least one layer of the plurality manifests a greater oxidation than would be present in

an equal thickness of an underlying layer of the plurality, and wherein at least one layer in the plurality includes a component not present in other layers of the plurality, , further wherein an underlying layer oxide is substantially absent from an interface between the capacitor dielectric and the underlying layer.

64. (Previously Presented) The capacitor dielectric of claim 63, wherein the plurality of capacitor dielectric layers defines a total thickness that ranges between approximately 50 angstroms and approximately 70 angstroms.

65. (Previously Presented) The capacitor dielectric of claim 63, wherein each layer of the plurality defines an individual layer thickness that ranges between approximately 10 angstroms and approximately 40 angstroms.

66. (Previously Presented) The capacitor dielectric of claim 63, wherein at least a lowest layer of the plurality defines an individual thickness of approximately 20 angstroms.

67. (Currently Amended) A capacitor dielectric, comprising a plurality of capacitor dielectric layers abutting a supporting surface having a uniform composition and extending into a recess and an electrode layer extending into the recess, wherein each layer of the plurality is a high-K dielectric, and a dielectric layer adjacent a supporting surface is un-annealed, further wherein at least one layer of the plurality manifests a greater oxidation than would an equal thickness of an underlying layer of the plurality, wherein each layer of the plurality comprises tantalum pentoxide included within an adjacent layer of the plurality, and wherein the underlying layer includes a means to minimize oxidation beyond the plurality of capacitor dielectric layers, further wherein an underlying layer oxide is substantially absent from an interface between the capacitor dielectric and the underlying layer.

68. (Previously Presented) The capacitor dielectric of claim 67, wherein the plurality of capacitor dielectric layers defines a total thickness that ranges between approximately 50 angstroms and approximately 70 angstroms.

69. (Previously Presented) The capacitor dielectric of claim 67, wherein each layer of the plurality defines an individual layer thickness that ranges between approximately 10 angstroms and approximately 40 angstroms.

70. (Previously Presented) The capacitor dielectric of claim 67, wherein at least a lowest layer of the plurality defines an individual thickness of approximately 20 angstroms.